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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/965,247	09/28/2001	William K. Burns	79,056	3033

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EXAMINER
PETKOVSEK, DANIEL J

ART UNIT	PAPER NUMBER
2874	

DATE MAILED: 07/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/965,247	BURNS ET AL.	
	Examiner	Art Unit	
	Daniel J Petkovsek	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *September 28, 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). #4
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

Brian Healy
Primary Examiner

DETAILED ACTION

Information Disclosure Statement

1. The prior art documents submitted by Applicant in the Information Disclosure Statements filed on March 7, 2002, have been considered and made of record (note attached copy of forms PTO-1449).

Drawings

2. New corrected drawings are required in this application because the drawings are informal with hand-drawn figure numbers and figure listings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Specification

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

4. Claims 15 and 19 objected to because of the following informalities: in claim 15, "Mach Zhender" should read, "Mach Zehnder"; and in claim 19, line 7, "is polarized and noise reduced" should read, "is polarized and noise *is* reduced". Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 2, 4-6, 14-16, and 21-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Adams et al. U.S.P. No. 6,490,070.

Adams et al. U.S.P. No. 6,490,070 teaches (Figs. 1 and 2, column 3 line 49 through column 5 line 44) a polarization maintaining device 10 comprising: a source 12 providing an input, an electro-optic modulator 16 coupled to the source, and a polarization-maintaining amplifier (EDFA) 32, in which the source is polarized in the modulator and inputted into the PM amplifier to provide an amplified polarized output. Regarding claims 2 and 4-6, see EDFA 32 and PM fiber 14 coupled to a source that is capable of a pre-selected wavelength. Regarding claims 14 and 15, see column 3 lines 57-65. Regarding claim 16, see column 5 lines 26-33 for feedback control signals.

Regarding the method limitations of claims 21-22, the polarized light signal is provided as an input, is polarized by modulator 16, is amplified by EDFA 32, and a portion of the optical signal is tested in the quad cell detector 44 to create an electrical signal to be tested and monitored to create a feedback control loop to control the modulation of the device (noise-free, see column 5 lines 10-64).

7. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Walker et al. U.S.P. No. 6,023,362.

Walker et al. U.S.P. No. 6,023,362 teaches a polarized output device 10 comprising: a source 42, a modulator 44 coupled to the source, and a polarization maintaining amplifier 46 coupled to the modulator. The source is polarized in the modulator 44, and the output of the modulator is inputted to the amplifier 46, which inherently maintains the polarization and outputs an amplified optical signal, which clearly, fully meets Applicant's claimed limitations.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 3, 17, 18, and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adams et al. U.S.P. No. 6,490,070.

Adams et al. U.S.P. No. 6,490,070 teaches (Figs. 1 and 2, column 3 line 49 through column 5 line 44) a polarization maintaining device 10 comprising: a source 12 providing an input, an electro-optic modulator 16 coupled to the source, and a polarization-maintaining amplifier (EDFA) 32, in which the source is polarized in the modulator and inputted into the PM amplifier to provide an amplified polarized output. Regarding the method limitations of claims 21-22, the polarized light signal is provided as an input, is polarized by modulator 16, is amplified by EDFA 32, and a portion of the optical signal is tested in the quad cell detector 44 to create an electrical signal to be tested and monitored to create a feedback control loop to control the modulation of the device (noise-free, see column 5 lines 10-64).

Adams et al. '070 does not explicitly teach that a light source is a pump diode (claim 3), however, since no critical limitation of using a pump diode has been given, and pump diode sources are well known in the art, and it would have been obvious at the time the invention was made to a person having ordinary skill in the art to use a pump diode to create the optical input signal.

Adams et al. '070 does not explicitly teach the specifics of the feedback circuit that controls the modulation of the optical signal (claims 17-18). Adams et al. '070 teaches detection, conversion, demodulation, and other means for feeding back and controlling the functionality of the device. Although not explicitly disclosed, it would have been obvious at the time the invention was made to a person having ordinary skill in the art that the detected signal, while being converted to a control signal, could have been converted using an amplifier to improve the quality of the control signal.

Adams et al. '070 does not explicitly teach, in a method of producing a polarized optical output, that this output is sourced to a further component, such as a fiber optic gyro or a strain sensing array (claims 23, 24). It is well known in the art that optical components such as fiber optic gyros and strain sensing arrays benefit from using polarized optical inputs being sourced from another, and thus the advantage for these components to have such polarized inputs would have been obvious to a person having ordinary skill in the art.

10. Claims 7-13 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adams U.S.P. No. 6,490,070 as applied to claim 1 above, and further in view of Giles U.S.P. No. 5,481,391.

Adams et al. U.S.P. No. 6,490,070 teaches (Figs. 1 and 2, column 3 line 49 through column 5 line 44) a polarization maintaining device 10 comprising: a source 12 providing an input, an electro-optic modulator 16 coupled to the source, and a polarization-maintaining amplifier (EDFA) 32, in which the source is polarized in the modulator and inputted into the PM amplifier to provide an amplified polarized output. Adams '070 does not explicitly teach that the PM amplifier comprises an amplification light source to generate light, a 2nd doped optical fiber coupled to the amplification source, and a retro-reflecting orthogonal polarization converter coupled to the 2nd optical fiber to output a polarized amplified optical output.

Giles U.S.P. No. 5,481,391 teaches (Fig 3, column 5 line 54 through column 6 line 40, claim 1) an optical fiber amplifying system having a pump generator for generating light at a pre-selected wavelength into a rare earth (erbium) doped fiber, and a means for back reflecting the light signal through the doped fiber portion in an orthogonally polarized state to produce a polarized amplified output.

Since Adams '070 and Giles '391 are both from the same field of endeavor, the purpose of using a PM amplifier comprising an amplification light source to generate light, a 2nd doped optical fiber coupled to the amplification source, and a retro-reflecting orthogonal polarization converter coupled to the 2nd optical fiber to output a polarized amplified optical output, as disclosed by Giles '391, would have been recognized in the pertinent art of Adams '070.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use the specific polarization-maintaining amplifier of Giles '391 as the PM amplifier as used by Adams '070 (although not specifically explained) for

the purpose of producing efficient polarized amplified optical outputs in the manner as disclosed by Giles '391.

Regarding claim 13, the retro-reflector is a Faraday effect mirror. Regarding claims 19 and 20, a polarization prism is used, and feedback circuits to maintain and control transmissivity of the modulation using electrical signals and are disclosed by Adams '070 (for tapped amplification see 35 U.S.C 103 (a) rejections to claims 17 and 18 above). Regarding claims 10-12, rare-earth (erbium) fibers are disclosed by Adams '070, and, although not explicitly disclosed, using double-cladding with the 2nd fiber is an obvious modification to a person having ordinary skill in the art. Regarding claims 7 and 8, coupling the 2nd doped optical fiber and the amplification light source to a V-groove optical fiber (and using a pump diode for the source) are obvious modifications to the polarization maintaining amplification device, since a person having ordinary skill in the art at the time the invention was made would recognize that coupling the optical signal to a number of fibers/waveguide for optical coupling (and using a pump diode for pumping) are well known forms in the art of coupling and pumping with polarization maintaining amplification devices.

Inventorship

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure, with respect to the state of the art of modulated and polarization maintaining amplification of an optical signal: PTO-892 form references F-J, and also:

U.S.P. No. 5,521,751 to Aida et al. (see claim 1).

U.S.P. No. 5,303,314 to Duling et al. (see Fig. 9, retro-reflector, and column 8 lines 30-35).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel J Petkovsek whose telephone number is (703) 305-6919. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (703) 308-4819. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 872-9321.

Daniel Petkovsek
June 26, 2003

Brian Healy
Primary Examiner